

CLAIMS

[1] A refrigerating apparatus, comprising a refrigerant circuit in which a first cooling circuit having a first heat exchanger for cooling inside and a second cooling circuit having a second heat exchanger for cooling inside and a sub compressor are connected in parallel
5 to a heat source side circuit having a main compressor,

wherein the refrigerant circuit includes three-way switching mechanisms for switching between first operation for sending, after refrigerant from the second heat exchanger is compressed in the sub compressor, the refrigerant to a suction side of the main compressor and second operation for circulating, after refrigerant from the first heat
10 exchanger is compressed in the sub compressor, the refrigerant to the first heat exchanger through the second heat exchanger, and

the refrigerant circuit performs the second operation during defrosting operation for defrosting the second heat exchanger.

15 [2] The refrigerating apparatus of Claim 1,

wherein the three-way switching mechanisms are a first three-way switching mechanism for allowing the second heat exchanger to communicate with a suction side of the sub compressor in the first operation and allowing the second heat exchanger to communicate with a discharge side of the sub compressor in the second operation and a
20 second three-way switching mechanism for allowing the suction side of the main compressor to communicate with the discharge side of the sub compressor in the first operation and allowing the suction side of the main compressor to communicate with the suction side of the sub compressor in the second operation.

25 [3] The refrigerating apparatus of Claim 2,

wherein the three-way switching mechanisms are three-way valves.

[4] The refrigerating apparatus of Claim 2,

wherein each of the three-way switching mechanisms is composed of a main pipe, two branch pipes branching in two ways from the main pipe, and a pair of on-off valves which are provided in the branch pipes and one of which is closed when the other is
5 opened.

[5] The refrigerating apparatus of any one of Claims 1 to Claim 4,

wherein the second cooling circuit includes: a thermostatic expansion valve which detects temperature of the refrigerant flowing out from the second heat exchanger for
10 adjusting opening of its own; and a first bypass passage in which refrigerant bypassing the thermostatic expansion valve flows in only the second operation.

[6] The refrigerating apparatus of any one of Claims 1 to Claim 4,

wherein the second cooling circuit includes an expansion valve variable in opening,
15 and
the refrigerating apparatus further comprising:

control means for keeping the expansion valve being opened fully in the second operation.

20 [7] The refrigerating apparatus of any one of Claims 1 to Claim 4,

wherein the refrigerant circuit includes a second bypass passage in which refrigerant bypassing the sub compressor flows during stop of the sub compressor, and
the refrigerating apparatus further comprising:

control means for stopping, in transition from the second operation to the first
25 operation in termination of the defrosting operation, the sub compressor for a predetermined time period and allowing the sub compressor to start operating thereafter.

[8] The refrigerating apparatus of any one of Claims 1 to Claim 4, further comprising:

defrosting start judging means for allowing the defrosting operation to start by switching the refrigerant circuit from the first operation to the second operation, the defrosting start judging means allowing the defrosting operation to start on the basis of
5 elapsed time after the first operation starts, an amount of frost of the second heat exchanger, or inside temperature of equipment in which the second heat exchanger is provided.

[9] The refrigerating apparatus of any one of Claims 1 to Claim 4, further comprising:

defrosting end judging means for terminating the defrosting operation by switching
10 the refrigerant circuit from the second operation to the first operation, the defrosting start judging means terminating the defrosting operation on the basis of elapsed time after the second operation starts, discharge pressure of the sub compressor, temperature of the refrigerant flowing in the second heat exchanger, or inside temperature of equipment in which the second heat exchanger is provided.